**北京交通大学考试试题（A卷）**

学生学院班级学号姓名任课教师

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课程名称：软件体系结构学年学期： 2014—2015学年第二学期

课程编号：A0L216Q开课学院：软件学院出题教师：冀振燕、曾立刚、包尔固德

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**Section I (2 points for each, 20 points in total) Single choice.**

\_\_A\_\_ 1. The three components of software architecture include: software elements, properties of the elements, and\_\_\_\_.

A. Relationships of the elements

B. Stakeholders of the elements

C. Implementation

D. Design principles and patterns

\_\_C\_\_ 2. Which of the following is a structural pattern?

A. Singleton Pattern

B. Builder Pattern

C. Composite Pattern

D. Template Pattern

\_\_D\_\_ 3.With SRP principle, \_\_\_\_ is NOT correct.

A. A class has high cohesion.

B. A class has only one reason to change.

C. A class has single responsibility.

D. A class has multiple responsibilities.

\_\_D\_\_ 4. Which of the following is NOT included in Rational's 4+1 views?

A. Use case view

B. Design view

C. Implementation view

D. Model controller view

\_\_C\_\_ 5. E-business websites such as Amazon and Taobao need to guarantee 24/7 user access to the website without any downtime. What quality attribute is this?

A. Performance

B. Security

C. Availability

D. Usability

\_\_A\_\_6. A software design has part of its application logic in client side and part in server side, so the style could be\_\_\_\_.

A. Thick client and server

B. Thin client and server

C. Peer to Peer model

D. All of above

\_\_D\_\_7. What is NOT true about the Dependency Inversion Principle?

A. High-level modules should not depend on low-level modules.

B. Abstractions should not depend on details.

C. Introduce an abstraction layer between high level classes and low level classes.

D. Low-level classes should not depend on abstractions.

\_\_D\_\_8.Which of the following systems is suitable for using MVC?

1. Operating systems.
2. Real-time video processing systems.
3. Network protocol stacks.
4. Web-based application.

\_\_C\_\_9. Three elements of software product line do NOT include\_\_\_\_.

A. Core asset development

B. Product development

C. Artifact development

D. Management

\_\_B\_\_10. A design pattern, which is used to add additional functionality dynamically to an object, is\_\_\_\_

A. Adapter Pattern

B. Decorator Pattern

C. State Pattern

D. Factory Method Pattern

**Section II (1 point for each question, 5 points in total) True and False.**

( T ) 1. In peer-to-peer style, each node can act as both a server and a client.

( F ) 2. Architectures are not influenced by the technical environment.

( T ) 3. The number of design patterns is not restricted to 23.

( F ) 4. Throughput is an aspect of the scalability attribute.

( F ) 5. The intent of applying the abstract factory pattern is to make the client to deal with tree-structured data easily.

**Section III (8 points for each, 40 points in total)Answer the questions in brief.**

1. When you implement a web application, you put business logic and database access logic in the same class. Which principle is violated? How to fix it?

Single Responsibility Principle. Separate the two logics into two classes.

1. Describe the structures of 3 layer Client-Server style and Model-View-Controller style. Tell their differences.

3 layer CS: presentation logic in client layer, business logic in first server layer, and data access logic in second server layer;

MVC: user interface for the View, control of user interface for the Controller, and the remaining logics for the Model.

1. A news agency gathers news and publishes them to different subscribers, such as SMS subscribers and Email subscribers. The agency can inform its subscribers immediately when news is available. Identify the appropriate design pattern. Explain the intent of this pattern. Draw the class diagram.

Observer Pattern for one class to make changes according to the other class' changes.

1. What is “4+1” view? Why do we need model a software system from different views?

Use case view, design view, interaction view, implementation view and deployment view. Many stakeholders are involved in one software system, and they need to see the system in different aspects.

1. Explain the advantages and disadvantages of Pipe and Filter style and give an example of using pipe and filter.

Advantages: High cohesion in filters and low coupling between filters. Disadvantages: Consistent data format required for two continuous filters. Input and output data format fixed.

**Part IV (35 points in total). Analyze the system description and answer the questions.**

An online book store has the following features,

1. Book list – can list books by categories. When a book is selected, the detailed information about the book is displayed.
2. Book Detail - Customers can quickly see book pricing, quantity, and other detailed information when a book is selected.
3. Shopping Cart - allows customers to browse through the online book store and quickly build an order. The books in the shopping cart can be added, listed and removed.
4. Payment with different Credit Card - allows a customer to pay his order with different credit cards.
5. Saved Personal Info - allows customer to add all their personal info into the system, and save for future use.
6. Searching- allows customer to search books in different ways, by book name, book ISBN or book authors.
7. Get alerts-A customer can subscribe and receive timely SMS and email message from the online bookstore about any price adjustment of books.

Tasks:

1. (5 points) what architectural style/pattern will you use to implement the system? Why?
2. (9 points) draw the detailed architecture diagram for the whole system and give necessary explanation.
3. (16 points) what design patterns can be used to implement the system? Explain how to use them in your system and draw corresponding class diagrams for the scenario. You need identify four design patterns.

4.(5 points) How to secure online shopping? Describe your design ideas.